DOCUMENT RESUME

ED 028 029 RE 001 429

By-Henderson, Edmund H.

Do We Apply What We Know About Comprehension.

Pub Date Apr 68

Note-16p.; Paper presented at International Reading Association conference, Boston, Mass., April 24-27, 1968.

EDRS Price MF-$0.25 HC-$0.90

Descriptors-Basic Reading, *Cognitive Development, Language Experience Approach, Learning Theories, Methods Research, Programed Materials, *Reading Comprehension, *Stimulus Behavior

The behaviorist and cognitive views of learning and language are contrasted, and some methodologies derived from the opposing positions are described. Programed reading in the form of machines, kits, and self-servicing devices of all sorts and most basal reader programs are identified as products of the behaviorist theory of reading instruction. The language experience approach is identified as a product of the cognitive theory. Curriculums derived from the behaviorist view of learning have produced gains in comprehension as measured by standardized tests. Presently, the cognitive view has had little effect on curriculum development, and differences in achievement as measured by standardized tests have not been impressive. However, one cognitive approach group has shown a 3-year superiority to a basal reader group. Utilization of current scientific and pedagogical knowledge to attain comprehensive reading instructional goals is recommended. References are listed. (BS)

ED023027

DO WE APPLY WHAT WE KNOW ABOUT COMPREHENSION

U. S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
OFFICE OF EDUCATION

THIS DOCUMENT HAS BEEN REPRODUCED EXACTLY AS RECEIVED FROM THE PERSON OR ORGANIZATION ORIGINATING IT. POINTS OF VIEW OR OPINIONS STATED DO NOT NECESSARILY REPRESENT OFFICIAL OFFICE OF EDUCATION POSITION OR POLICY.

by

Edmund H. Henderson
The Reading Study Center
College of Education
University of Delaware
Newark, Delaware

RE 001 429

Presented at International Reading Association, Boston, Massachusetts, April 1968

DO WE APPLY WHAT WE KNOW ABOUT COMPREHENSION

The question "Do we apply what we know about comprehension" asks two things: "What do we know?" and "What do we apply?" Both questions are difficult to answer objectively, and the first is particularly so because, while theories abound, the state of our knowledge is in fact very incomplete. For this reason it seems to me that the question should be altered to read "What do we think to be true about the process of comprehension in reading?" and "What effects, if any, have these thoughts had upon classroom practice?" In this form it is perhaps possible to approach an answer that may qualify as fair and neutral.

In what follows I will attempt to contrast the behaviorist and the cognitive view of learning and language and to identify some methodologies that appear to have derived from these somewhat opposing positions. Conclusions about the topic question will be based upon this analysis.

Stimulus - Response Versus Cognition

S-R Theory - Watsonian behaviorism - has become as American as apple pie and Whistler's Mother. Despite our mild embarrassment about its Russian origins, we have taken it to our hearts, and operationism now so dominates the theory and practice of teaching that educators, like preoperational children, often cannot see themselves for it.

That this should be the state of affairs is a little ironic, for American educators have regularly rejected the behaviorist model as

inadequate for their complex learning goals and have ~~exposed~~ espoused instead the more mentalistic theories of cognition. It is not, however, just a case of saying one thing and behaving another. Rather, it would seem, that the less comprehensive but more explicit behaviorist model has been more productive. It lends itself more easily to the construction of teaching materials that can be mass produced. It appears more concrete. Psychologically there is a sense of reality and comfort in the sequence, stimulation - response - reward. On the other hand, no matter how appealing it may be to our sense of self-complexity, there is much vagueness and uncertainty in the cognitive game of staging a setting in which insight may occur.

Truth, however, does not lie wholly in either position, nor is one way more "scientific" than the other although such an image is sometimes claimed for the behaviorist. Each position has its assets, its liabilities, and its more appropriate areas of application. DeCecco's (1967) excellent book of readings gives a picture of both the divergence and the convergence of the two positions as they relate to language and thought. In one section he includes Skinner's analysis of verbal behavior in which the noted behaviorist makes this bold assertion:

> "The basic processes and relations which give verbal behavior it's special characteristics are now fairly well understood. Recent work has shown that the methods (i.e., operant conditioning with laboratory animals) can be extended to human behavior without serious modification."

(DeCecco 1967)

Next one reads a review of Skinner's text by Chomsky. "In the present state of our knowledge we must attribute an overwhelming influence on actual behavior to ill defined factors of attention, set, volition, and caprice." He challenges the consistency of Skinner's use of the terms stimulus and response and asserts that a psychologist following

this model must either declare and accept a large area of "unknown" or restrict his investigations to that segment of behavior which is lawful and not capricious.

In the same context (DeCecco 1967), the psycholinquist Miller concluded:

> "If the hypothetical constructs that are needed seem too complex and arbitrary, too improbable and mentalistic, then you had better forego the study of language, for language is just that complex arbitrary improbable and mentalistic and no amount of wishful theorizing will make it anything else."

Thus men of substantial talent and experience differ.

Between these poles there is, of course, genuine accomodation. The so-called neo-behaviorists have modified the S-R model in various ways to account more precisely and not capriciously for the complexity of language function. (Osgood's mediated response, Gagne's hierarchies, Berlyne's chains are examples). Nonetheless, at a simple and practical level one is forced, I think, to recognize that a basic difference in emphasis between the two positions does exist and that this difference does influence curriculum.

However, eloquently the chain of responses may be elaborated, at a critical point one senses the saliva and the bell. O is stimulated and produces a response which is rewarded, and further reinforcements are then scheduled over time by E. As these events are complexly elaborated this S-R model takes on the global quality of the cognitive field. But a difference lies in this--the cognitive position focuses not upon the Stimulus and the Response but upon the action of the individual upon a relatively unconstrained environment.

S-R Theory and Reading Materials

An examination of typical reading instructional material shows from which psychological position they are derived. The most obvious representative

of behaviorism is the so-called "programmed reading" approach which is a direct application of Skinner's principles. In these materials an attempt is made to identify each behavioral outcome necessary to the attainment of a certain performance and to arrange these intervening behavior outcomes in their proper sequence from non-performance to performance of the educational objective. The learner then moves along this chain successively producing and reinforcing the responses that will sum to the desired skill. The success of such a program depends, importantly, upon the precision with which the writer has analyzed the educational objective and herein lies a limitation of and practical difficulty in the approach. Also, the requirement that outcomes be concrete specifiable behaviors, a goal of doubtful attainment (Deno and Jenkins 1968) makes this approach more applicable to some tasks than to others. It is easier to program arithmetic, for example, than reading, and easier to program word-recognition skills than comprehension skills. The typical programmed reader today follows a somewhat more detailed, though certainly standard, sequencing of word-recognition skills. When, on the other hand, its goal is the more cognitive skill of comprehension, it appears to differ not at all from the study or skill tests of the common basal reader.

It would appear, then, that the unique feature of the "programmed reader" is its self-servicing format. Otherwise it is like the standard basal program which itself is clearly built upon the S-R model. In both, for example, phonic skills are sequenced and practiced on a planned schedule. In both new vocabulary is introduced on a word-by-word basis and in the basal reader these words are reintroduced according to a strict reinforcement plan. Indeed this vocabulary control is adhered to so strictly that the structure of the language itself is violated (Lafevre 1964). Clearly this circumstance, true of nearly every basal reader program, is as contrived as

any Skinner box and the psychological theory and purpose in each case is the same.

S-R Theory and Comprehension Training

When one considers the manner in which comprehension is taught in the typical basal reader program, the particular emphasis or focus of the behaviorist becomes even more apparent. The silent reading of a passage involves, in Thorndike's (1917) terms, all the attributes generally attributed to thinking. To deal with this, one may take the cognitive position, analyze the parts and sequences of the process and develop specific training for each. The behaviorist however, avoids this step. Instead he leaves change of a cogntive nature to inference based upon observable behavior. In terms of reading comprehension this means that the behaviorist will avoid a direct analysis of the reading-thinking process, but seek to influence this process by reinforcement of its consequences--i.e. the answers to questions about a passage. It should be noted that the availability of this kind of behaviorist response--(an answer to questions) is no guarantee that it is an entirely valid or complete consequence of comprehension. The cognitivist would argue that it is not. Nonetheless the typical basal reader program is consistent with the S-R psychological position in that comprehension training consists largely of teacher formulated questions posed, sometimes before, occasionally during, but usually after a student reading assignment.

The evaluation or testing of reading comprehension achievement typically follows a similar question--answering formula. Research in this area has succeeded over the years in differentiating between two factors - factual recall and something more than that called inference (Lennon 1962). Thus it is possible to give differential training in these two modes. In actual

practical questions of various types are usually included and Davis (1968) has recently reported that if separate passages are used, a number of these question categories may be discriminated factorially.

It is possible, of course, to study reading comprehension in various other ways. One example is the currently popular close test, or the close test augmented by retrospective interviews as described by Jenkinson (1958). Another very interesting example, employed by Johnson (1966), is the use of overlapping free associates of relevant concepts. Nonetheless, the straight question-and-answer, teach by test, or reinforcement model is both the criterion and the strategy for teaching reading comprehension in the typical basal reader program. When it is held in mind that these readers are used in 90 per cent of our schools (Austin), it may be said that this is the strategy being used to instruct most of today's school children in this country.

Cognitive Implications for Instruction

The implications of the cognitive position contrasts with those of the S-R model in three principal ways. First, the emphasis shifts from the teacher to the pupil as the responsible figure in the learning task. It is not what teacher does to the pupil but what the pupil does to the material that is significant. Second, since it is the pupil's act that initiates learning, it is he who selects from the field what is to be acted upon. This circumstance requires that the field be presented intact, not preselected or fragmented by the teacher. Third, a cognitive approach leads to and indeed implies that a detailed analysis of the thinking skills has been made. In the learning to read process it is not mastery of content but the act of selection and the exercise of these cognitive skills that is significant.

Piaget conceptualizes the cognitive domane with a biological metaphor of equalibration, assimilation and accomodation. One premise is that a healthy organism is self-directed and acts upon its environment much as a healthy boy will seek food of a balanced nutritional value. A second premise is that the organism acts upon that aspect of the total envirorment which is assimilable. A third premise is that through the process of accomodation the organism changes his capacity for assimilation by reorganizing and combining overtly or covertly various schema which themselves in primitive form were simple reflexive behaviors. (Flavell 1963)

It follows from Piaget's model that the learner will come to know things in a sequence or order which is inviolable. Nor will any amount of imposed drill of the S-R type alter this circumstance. He may not accomodate to that which is not assimilable. That this is a correct accounting has been repeatedly demonstrated, first by Piaget in his own free-wheeling clinical method and more recently with due experimental rigor by Laurendeau and Pinnard (1962), and Almy (1966) and others.

Cognition and Beginning Reading

One aspect of these developmental findings has particular relevance for the topic reading comprehension. When the child is at a certain stage, termed "preoperational" by Piaget, there are specific cognitive functions that he cannot perform. Among these is the operation of reversability which makes possible an intellectual transposition such that one can see himself as others see him, take the place of the other, emphathize and so on. It is this condition that Piaget labels as "egocentricism" - being locked in the self unable to move backward and forward on a self-other continuum.

In terms of reading comprehension, one may see that it is precisely this operation which is necessary in order to apply meaning to printed

language. Only by taking the place of the other is one able to anticipate coming events and so create the dynamic of context which facilitates the recognition of words, makes possible the selection of meaning and gives purpose, focus and efficiency to the total act. Thus it would appear that comprehension not word recognition is the prerequisite for beginning reading, and one should not expect children to begin to read, in any meaningful sense of that word, until this necessary cognitive function had developed. Piaget's work, as well as others, shows that this change occurs generally between the ages of five and seven. That this is the time children have been learning to read for centuries is probably not an accident. Moreover, Piaget's grand disregard for the exact time of the change and his emphasis upon the inviolability of the sequence and the need for vigorous activity within each sequence pronounces clearly his belief in the folly of all attempts to beat-the-game through education.

By some, beginning reading instruction is viewed as a period for decoding and the acquisition of a sight vocabulary and the instructional model employed for this is usually behavioristic. The Piaget model suggests that beginning to read is an integral part of an overall language development. In this circumstance it follows that a self-directed learner requires a setting in which language both oral and printed are natural and purposeful communication rather than isolated sub-standard language segments to be acquired on a conditioning basis.

The cognitive model, in short, suggests that the learning to read process should, insofar as possible, resemble the circumstances in which oral language itself was acquired. While it is held by some (Lenneberg 1967, for example) that the advent of oral language is at least in part innate, two aspects of this process are notably in keeping with the cognitive model. In learning to

speak the child is exposed not to one word at a time selected by a teacher but rather to the total language system from which he selects those parts which have usefulness for his own personal and social cummunication needs.

One sees here a basic rationale for a methodology which begins with experience, develops oral language that is sufficiently fluent to communicate purposefully and to anticipate outcomes, and then exposes the beginning reader to the printed form of his own language complete in its natural form. The learner acquires a sight vocabulary from this medium on a functional self-selection basis. Controlled vocabularies are avoided and words are learned only in the course of a purposeful and self-directed quest for comprehension. Thus a shift in psychological model yields a fairly dramatic shift in method - one that is commonly termed today the Language-Experience Approach. While I do not know of any survey that gives up-to-date figures, it would be my guess that less than one per cent of today's school children are so instructed during primary grades.

Cognition and the Reading-Thinking Process

The cognitive position also makes possible an analysis of reading comprehension beyond its beginning stages. When considered in a communication framework, the reading process may be described as an interaction of certain divergent and convergent cognitive skills (Guilford 1959). Both before and during the reading of a passage, the skillful reader engages in both causal and imaginative thinking, by means of which outcomes in the reading material are anticipated and predicted. Such decision processes are considered essential to comprehension and suggest an active participation of the reader with the material, in which hypotheses about outcomes are made. The decoding process, itself, is directed toward a testing of these hypotheses, and comprehension is reached as the hypotheses are confirmed, disconfirmed or retained.

This theoretical view has been extensively developed by Stauffer (1959) and lends itself to a method of reading comprehension training that is quite different from one derived from the S-R model. In the Stauffer approach questions over the content are used only as an occasional testing device not as a conditioning mechanism. Instead the reader is led to declare, in a group setting, the decisions he makes at various points just prior to and during the reading of a selection.

The pupil is given practice in divergent thinking when he is asked to project several possible story themes on the basis of minimal evidence--as a title or a single picture. Both convergent and divergent skills are studied when one group member observes the evidence another used to anticipate a turn of plot and when he notes how this reader then rejects or affirms old hypotheses and advances new ones. Judicious openmindedness is practiced as the reader experiences the value of maintaining a reasonable prediction until sufficient evidence is given (Henderson and Long 1968). Convergent skills are exercised when he declares his thoughts about how a story will end or a problem is resolved and gives reasons for the decisions he has made. In this way the covert thinking process is made explicit and the adequacy and basis of each decision is weighed and modified toward greater efficiency.

This cognitive-based strategy for comprehension training was developed during the early fifties and included in a new language arts reading series published in the early sixties (Stauffer, et al. 1962). Consistent with the psychological model--the program recommended that the grotesquely controlled preprimers be abandoned and a language-experience approach used in their stead. Basal readers were to be used no more than half the year and then as a means for group comprehension training not for conditioned word

acquisition. The remainder of the time was to be devoted to guided self-selection in trade books. Finally pupils were to be held responsible at all times for the application of word-attack and concept development skills. No vocabulary was pre-taught. A small number of pupils are pursuing such a reading program at this time. In addition, again according to the Harvard Report, (Austin 1961) one might predict that a small percentage of American school children are following an individualized reading instruction program.

National Concern for Purpose

Before turning at last to the topic question, it is necessary to mention the vigorous research activity by all groups--behaviorist, neo-behaviorist and cognitivist--that has addressed itself to critical thinking, problem solving, discovery learning and the like during the past decade. Names like Bruner, Gagne, Berlyne, Suchman, Klausmeier, Covington come to mind at once. Nothing could be more certain than the determination of these psycho-educational leaders to provide a means of instruction that is more meaningful, purposeful and self-sustaining. Progress has been and is being made in the areas of science and math--yet one looks in vain, I believe, for similar changes of a substantial nature in the basal reader programs that are used in most American schools The Ohio study of Critical Thinking and Reading Wolf et al (1967) is an example of the tentativeness with which we are moving. Here a really fine study with very interesting work in the Critical Thinking area advances us only to the conclusion that Critical-Thinking training facilitates reading comprehension. It seems very clear to me that the present state of research in the cognitive and reading-thinking processes would permit far more substantial enterprises than we now support.

How Comprehension is Taught

What do we think we know about comprehension training and what is its effect? It seems to me that we have firm evidence that a curriculum derived from the S-R model, one which reinforces the correct answer to comprehension questions of different kinds, affects a certain kind of reading behavior positively. In the course of such training pupils do make gains in power of comprehension as measured by standardized tests and they are scoring higher on this measure today than they were fifty years ago. (Gates 1962)

Further, it is evident that this approach has lent itself to the mass production of teaching materials--machines, kits, self-servicing devices of all sorts, which themselves have met the demands of an educational system faced with a population explosion and an egalitarian revolution.

What about the other things we think we know about comprehension--those ideas based upon a cognitive model and developed through analysis and equally intensive research? It would appear that their effect on the curriculum is comparative negligible. Furthermore, when field studies have been conducted, the differences in achievement as measured by standardized tests are not particularly impressive. In the Seaford study, about which I have some close personal knowledge, pupils following what Stauffer now labels a Comprehensive Reading Program were superior to the basal reader control group consistently for three successive years. The differences were significant statistically. Nonetheless one must still ask what the human significance of this difference is. What does it mean when we say that one group is .5 years ahead of another on the standardized test measure? I am personally disinclined to believe very deeply in such a difference.

The difficulty, it seems to me, lies in the measures that we use. Power of comprehension divorced from the concept of maturity in reading is meaningless. One must ask what does a pupil choose to read? How well integrated is his choice with his personal interests, purposes and responsibilities? How versatile is he in applying techniques that yeild either breadth or depth of comprehension? What effect has his reading upon his life?

It seems to me that we have now the scientific knowledge and the pedagogical technique to strive toward these comprehensive reading instructional goals. It is our responsibility to be clear with our clients and ourselves about what we are affording and what we choose to afford.

BIBLIOGRAPHY

Almy, Millie, Chittenden, W. E., and Miller, Paula. Young Children's Thinking. Columbia University, New York: Teachers College Press, 1966.

Austin, Mary. The Torchlighters: Tomorrow's Teachers of Reading. Cambridge, Massachusetts: Harvard Graduate School of Education, 1961.

Davis, Frederick B. "Identification and Measurement of Reading Skills of High School Students." Paper presented at American Educational Research Association, 1968.

DeCecco, J. P. Readings: The Psychology of Language, Thought and Instruction. New York: Holt, Rinehart and Winston, Inc., 1967.

Deno, Stanley and Jenkins, Joseph. "On the 'Behaviorality' of Behaviorial Objectives," Unpublished manuscript, University of Delaware, 1968.

Flavell, J. H. Developmental Psychology of Jean Piaget. New York: Van Nostrand, 1963.

Gates, Arthur I. "The Word Recognition Ability and the Reading Vocabulary of Second and Third Grade Children," Reading Teacher. (May 1962).

Guilford, J. P. "Three Faces of the Intellect," American Psychologist, Vol. 14 (December 1959), 469-79.

Henderson, E. H. and Long, Barbara H. "Decision Processes of Superior, Average and Inferior Readers." Paper presented Eastern Psychological Association, 1968.

Jenkinson, Marion D. "Selected Processes and Difficulties of Reading Comprehension." Unpublished doctoral dissertation, University of Chicago, 1957.

Johnson, P. E. "Some Psychological Aspects of Subject Matter Structure." Paper presented at American Educational Research Association, Chicago, 1966.

Lafevre, C. A. Linguistics and the Teaching of Reading. New York: McGraw-Hill Book Co., 1964.

Laurendeau, M. and Pinard, F. Causal Thinking in the Child. New York: International Universities Press, 1962.

Lenneberg, Eric H. Biological Foundations of Language. New York: John Willey and Sons, Inc., 1967.

Lennon, Roger. "What Can Be Measured," Reading Teacher. Vol. 15, No. 5 (March 1962), 326-7.

Stauffer, R. G. Directing Reading Maturity as a Cognitive Process. New York: Harper and Row Publishers, 1968 (in press).

Thorndike, E. L. "Reading as Reasoning: A Study of Mistakes in Paragraph Reading," Journal of Educational Psychology, VIII (June 1917) 323-32.

Wolf, Willavene, Huck, Charlotte and King, Martha, et al. Critical Reading Ability of Elementary School Children. U. S. Department of Health, Education and Welfare, June 1967.

Stauffer, R. G., and Hammond, W. D., Effectiveness of a Language Arts and Basic Reader Approach to First Grade Reading Instruction. U. S. Dept. of H.E.W. 1965

---------- Effectiveness of a Language Arts and Basic Reader Approach to First Grade Reading Instruction --- Extended into Second Grade. U.S. Dept of H. E. W. 1966